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(54) Title: IMPLEMENTATION OF VCR PLUS+ IN DSS RECEIVERS (57) Abstract A system for automatically controlling the recording of a television program by a video recorder connected to a DBS system. The system receives information that identifies particular television programs, the information including a channel identifier. A memory is also provided which includes correlations for a number of cities between uniform channel identifiers and local channel numbers that correspond to the uniform channel identifiers. A city code is entered into the system to select the appropriate city where the system is located.		

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IMPLEMENTATION OF VCR PLUS+ IN DSS RECEIVERS

5 BACKGROUND

As a result of DSS's successful launch in 1994, there has been considerable interest in the compatibility of VCR Plus+ instant programmer technology (see publications WO 90/07844 and WO 93/0771) with DSS. In North America, the PlusCode System has 1 through 8 digits and is
10 capable of representing 191 channels, which is more than adequate to cover all the meaningful DSS channels.

DETAILED DESCRIPTION

15 *CHANNEL LINE-UP*DSS Channel Line-up

At present, the DSS has approximately 200 channels. Among these are 29 Digital Audio
20 Channels with no published scheduled programming. These 29 channels (DSS 501-529) will therefore NOT be represented in the PlusCode System.

DSS also has channels 100 - 199 reserved for Pay-per-view channels, of which 77 are being used. A Pay-per-view movie is typically shown many times a day, and repeated every day for the whole month. A viewer can, pretty much watch a desired pay-per-view movie any time
25 (at roughly 2 hour intervals), any day. There is therefore no need to do pre-programmed VCR recording. As a result, these channels are also NOT represented in the PlusCode System.

The DSS Channel Line-up has many extra channels not normally found in cable systems. For example, DSS has both HBO-East and HBO-West. Cable systems usually will carry one or the other, but not both HBO feeds. If a user reads the TV Guide or a local newspaper and enters
30 a PlusCode corresponding to an HBO program, then depending on the TV Guide edition or the newspaper, the program can correspond to either an HBO-East program or an HBO-West program. Furthermore, this correspondence may change in time. A cable company may decide to switch its HBO reception from the East feed to the West feed. It is therefore **NOT POSSIBLE** to use PlusCodes as published in TV Guide or local newspapers to do DSS VCR Plus+
35 programming. Instead, he must use a TV listing dedicated to DSS programming which lists all the DSS channels separately. Any magazine that carries PlusCodes for DSS channels will have the same Guide Channel assignments.

Local Over-The Air Channel Line-up

- 5 DSS does not include local over-the-air broadcast channels. As a result, users who wishes to receive local channels must have a separate antenna. The PlusCode System obviously should still allow such users to record over-the-air channels by entering the PlusCodes printed in his local newspaper or TV Guide.

10 *GUIDE CHANNEL ASSIGNMENT*

By judicious assignment of Guide Channels, the DSS user will be able to record both local over-the-air channels as well as DSS channels.

15 Guide Channel Assignment for Local Over-The-Air Channels

- 20 For local over-the-air channels, if their natural channel numbers are less than or equal to 32, then the Guide Channel numbers typically remain the same. In this case, no channel mapping is necessary. If the natural channel number is between 33 and 64, then the Guide Channel number typically will be reassigned to a value between 1 and 32. In any event, to avoid conflict with DSS channels, the assigned guide channel numbers for all over-the-air channels will remain the same, i.e. DSS channels will avoid using guide channel numbers which have already been assigned to local over-the-air channels.

25 Guide Channel Assignment for DSS Channels

- 30 The Guide Channel assignment for DSS channels is listed in Appendix C, which also includes the actual DSS channel numbers. In VCR Plus+ terminology, the DSS Channel numbers are in fact "TV Channel" numbers. In effect, to VCR Plus+, the DSS system acts like one cable system. Table A is in fact a definition of the Guide Channel - TV Channel channel map for this system.

METHOD OF DOING CHANNEL MAPPING

35 Channel Mapping for Local Over-The-Air Channels

To establish guide channel map of local over-the-air channels into the VCR, there are 3 methods:

V-Set

- 5 This relies on using a VBI decoder to capture channel map data broadcast by Gemstar local hosts in all ADI's in support of Index Plus+, Guide Plus+ and V-Set VCR Plus+. This method involves additional hardware cost, e.g. VBI decoder.

Using channel maps stored in memory

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There are 2 variations in this method:

1. Maps are stored in memory and indexed by a City Number. List of major cities in the U.S. can be listed as a table in the user's manual in state alphabetical order. A user looks up his city to find the City Number. He enters the City Number into the VCR during the set-up process. The VCR then looks up the channel map from memory. In this manner, the user does not need to understand terminologies like Guide Channel, TV Channel, double channel mapping, etc. There is also no danger of his inputting Guide Channel number and TV channel number in reverse. The whole process of channel mapping (for over-the-air channels) is reduced to one single step of entering a 3 digit city number. Next to each city is a city number and a multi-digit number. The multi-digit number summarizes the Guide Channel - TV Channel mapping for over-the-air channels whose Guide Channel numbers are not the same as the TV Channels. For example, for New York City, the multi-digit number 06471241 means:

25

Guide Channel	TV Channel
06	47
12	41

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The storage of city numbers together with the Guide Channel - TV Channel information in VCR's micro-controller's ROM takes roughly 1200 bytes. Other than the extra ROM, this method does not involve any additional hardware cost.

2. This method is similar to 1. above. However, instead of having to user to look up a table of cities in the user's manual, the list of states and then cities can be presented on screen for the user to choose as part of the set-up process. The memory requirement in this case is the 1200 bytes mentioned in 1. above, together with the names of about 290 major cities, which takes an additional 3000 bytes.

Manual entry

- 5 This requires the user to look up the channel map from TV Guide or the local newspaper and then enter the guide channel - TV channel numbers by hand.

Channel Mapping for DSS Channels

- 10 To the VCR, the DSS receiver acts like a cable box. Since the DSS channel map is well defined in this case, it is highly recommended that it is stored in memory (ROM). This way, instead of having the user manually doing channel mapping for close to 100 DSS channels, he can simply choose the "DSS" option during setup and the whole map is automatically entered. The manufacturer should allow for manual entry of DSS channel number in case it is changed
15 in the future. Such entry should be stored in EEPROM and overwrites the DSS channel number stored in ROM.

OPERATIONS

- 20 It is important that the manufacturer well specifies how the DSS receiver, external antenna (for over-the-air local channel reception) and the VCR should be connected. The connection configuration determines how the VCR should carry out VCR Plus+ recordings. We recommend that the DSS output should be connected to the VIDEO IN or S-VIDEO IN of the VCR while the antenna signal should be connected to the ANTENNA IN of the VCR. We also recommend
25 that DSS receiver should be left on, consistent with our past treatment of cable boxes.

- Assume a user during setup indicates he has DSS. Then when he enters a PlusCode, the VCR can quickly decode the Guide Channel number. If the Guide Channel Number corresponds to an over-the-air channel, the VCR should switch its input to ANTENNA IN and then use the VCR's tuner to tune to the over-the-air channel to record. If the Guide Channel Number
30 corresponds to a DSS channel, the VCR should switch its input to VIDEO IN (or S-VIDEO IN), then send IR signal to the DSS receiver to tune to the right channel, and then start the recording.

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TABLE A

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DSS GUIDE CHANNEL ASSIGNMENT

VCR Plus+ CHANNEL ASSIGNMENTS for DSS, based on
Satellite DIRECT magazine-Pacific zone edition,
July 1996 issue

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	<u>Guide</u> <u>Channel</u> <u>Number</u>	<u>DSS</u> <u>Channel</u> <u>Number</u>	<u>DSS</u> <u>Identifier</u>	<u>Description</u>
15	1-32 *			(reserved)
	33	980	HBO-E	Home Box Office-East feed
	34	206	ESPN	Entertainment & Sports Programming Network
	35	219	AMC	American Movie Classics
	36 *			(reserved)
20	37	225	DSC	The Discovery Channel
	38	968	NIK	Nickelodeon
	39	221	A&E	Arts & Entertainment Network
	40 *			(reserved)
	41	985	SHO-E	Showtime-East feed
25	42	202	CNN	Cable News Network
	43	233	TBS	TBS Superstation
	44	229	USA	USA Network
	45	973	MAX-E	Cinemax-East feed
	46	967	LIF	Lifetime
30	47	232	FAM	The Family Channel
	48	989	MTV	Music Television
	49	235	TNN	The Nashville Network
	50 *			(reserved)
	51	226	TLC	The Learning Channel
35	52	212	TNT	Turner Network Television
	53	223	DIS-E	The Disney Channel-East feed
	54	258	BRAVO	Bravo
	55-56 *			(reserved) -

	57	217	BET	Black Entertainment TV
	58	977	TMC-E	The Movie Channel-East feed
5	59-61	*		(reserved)
	62	965	VH1	Video Hits One
	63	215	E! ENT	E! Entertainment TV
	64-91	*		(reserved)
	92	271	ENCOR	Encore
10	93-94	*		(reserved)
	95	981	HBO2-E	Home Box Office-Eastern feed
	96	982	HBO3	Home Box Office 3
	97	986	SHO2	Showtime 2
	98	974	MAX2	Cinemax 2
15	99-101	*		(reserved)
	102	287	ABC	WJLA Washington D.C. (ET)
	103	282	CBS	WRAL Raleigh NC (ET)
	104	284	NBC	WNBC New York NY (ET)
	105	286	PBS	National
20	106	289	FOX	FoxNet (ET)
	107	288	ABC-W	KOMO Seattle WA (PT)
	108	283	CBS-W	KPIX San Francisco CA (MT)
	109	285	NBC-W	KNBC Los Angeles CA (PT)
	110	*		(reserved)
25	111	983	HBO-W	Home Box Office-West feed
	112	984	HBO2-W	Home Box Office 2-West feed
	113	987	SHO-W	Showtime-West feed
	114	975	MAX-W	Cinemax-West feed
	115	224	DIS-W	The Disney Channel-West feed
30	116	978	TMC-W	The Movie Channel-West feed
	117	970	FLIX	Flix
	118	220	TCM	Turner Classic Movies
	119	270	STARZ	Starz!
	120	272	EN-LOVE	Love Stories (Encore 2)
35	121	273	EN-WSTN	Westerns (Encore 3)
	122	274	EN-MYST	Mystery (Encore 4)
	123	275	EN-ACTN	Action (Encore 5)
	124	276	EN-TRUE	True Stories & Drama (Encore 6)

	125	277	EN-WAM!	WAM! America's Youth Network (Encore 7)
	126-128 *			(reserved)
5	129	269	STRZ-W	Starz!-West feed
	130	266	IFC	Independent Film Channel
	131	995	SUND	Sundance Film Channel
	132-136 *			(reserved)
	137	208	ESPN2	ESPN2
10	138	304	GOLF	The Golf Channel
	139	315	KBL	KBL Sports
	140	325	PS-SW	Prime Sports Southwest
	141	326	PRIME	Prime Sports
	142	331	PS-W	Prime Sports West
15	143	316	HTS	Home Team Sports
	144	311	NESN	New England Sports Network
	145	310	MSGN	Madison Square Garden Network
	146	320	PASS	Pro Am Sports System
	147	317	SPTSO	SportSouth Network
20	148	318	SUN	Sunshine Network
	149	309	SCNE	SportsChannel New England
	150	312	SCNY	SportsChannel New York
	151	314	SCPHL	SportsChannel Philadelphia
	152 *			(reserved)
25	153	321	SCOH	SportsChannel Ohio
	154	322	SCCIN	SportsChannel Cincinnati
	155	323	SCCHI	SportsChannel Chicago
	156	332	SCPAC	SportsChannel Pacific
	157	330	PS-NW	Prime Sports Northwest
30	158	324	MSC	Midwest Sports Channel
	159	313	EMP	Empire Sports Network
	160	303	NEWSP	NewSport
	161	305	CSN	Classic Sports Network
	162	306	SPEED	Speedvision
35	163	307	OUT	Outdoor Life
	164	214	HGTV	Home & Garden Television
	165	222	HIST	The History Channel
	166	960	TVLAND	Nick at Nite's TV Land

	167	*		(reserved)
	168	227	TOON	Cartoon Network
5	169	990	COM	Comedy Central
	170	240	SCIFI	Sci-Fi Channel
	171	203	COURT	Court TV
	172	230	TRIO	TRIO
	173	298	TVAS	TV Asia
10	174	246	CNBC	Consumer News & Business Channel
	175	252	CNN-I/CNNfn	CNN International/CNNfn
	176	250	NWI	Newsworld International
	177	254	TRAV	The Travel Channel
	178	216	MUCH	MuchMusic
15	179	402	PLBY	Playboy TV
	180	236	CMT	Country Music Television
	181	247	MSNBC	MSNBC
	182-183	*		(reserved)
	184	213	HSN	Home Shopping Network
20	185	242	C-SPAN	Cable Satellite Public Affairs Network
	186	243	C-SPAN2	C-SPAN2
	187	963	ANC	All News Channel
	188	204	HNN	CNN-Headline News
	189	245	BLOOM	Bloomberg Direct
25	190	248	WEATH	The Weather Channel
	191	*		(reserved)

* Reserved: not applicable to current DSS lineup.

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CLAIMS:

- 5 1. A system for automatically controlling the recording of a television program by a video recorder comprising:
- means for receiving identifying information regarding a television program, including a channel identifier;
- a memory for storing a plurality of identifiers, each correlating to a city and for each
- 10 identifier, storing mappings between channel identifiers in the received identifying information and the over the air channel number for the correlated city for all channels where the channel identifier is different from the over the air channel.

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